Japanese Kokai Patent Application No. P2003-91945A

DOCKET # PD030125
CITED BY APPLICANT
DATE: _____

Job No.: 228-108702
Ref.: JP 2005-91945[D030125 US/PAV(DAVIDA)/#7049
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JAPANESE PATENT OFFICE
PATENT JOURNAL
KOKAI PATENT APPLICATION NO. P2003-91945A

Int. Cl.[7]: G 11 B 21/02
7/08

Filing No.: P2001-287215

Filing Date: September 20, 2001

Publication Date: March 28, 2003

No. of Claims: 4 (Total of 7 pages; OL)

Examination Request: Not filed

ADJUSTMENT MECHANISM FOR DISK DEVICE AND OPTICAL DISK DEVICE USING SAME

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[There are no amendments to this patent.]

Abstract

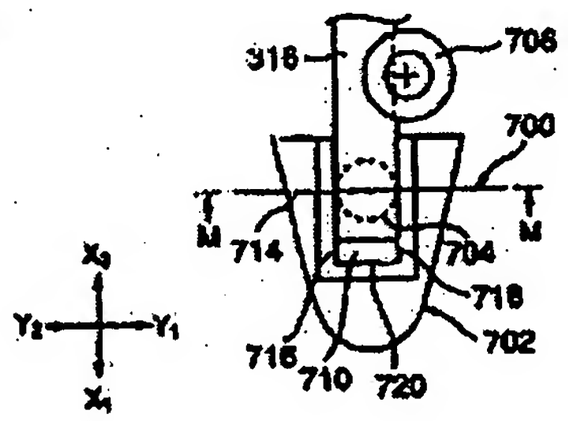
Problem

The problem of the present invention is to provide a type of adjustment mechanism that can easily adjust the parallelism between a disk surface and an optical pickup sliding surface, and a type of optical disk device using said adjustment mechanism.

Constitution

The present invention is characterized by the following facts: on base plate (222) that carries guide rod (316) guiding movement of optical pickup (250), the following parts are set: holder (702) carried on base plate (222) and supporting the end portion of guide rod (316), coil spring (704) accommodated in holder (702) and energizing guide rod (316) upward, and height adjustable screw (706) set on base plate (222) and having coupling portion (707) with guide rod (316) and defining the upward displacement of guide rod (316). By adjusting the height of screw (706), the height of guide rod (316) can be adjusted flush with the surface of base plate (222).

(A)



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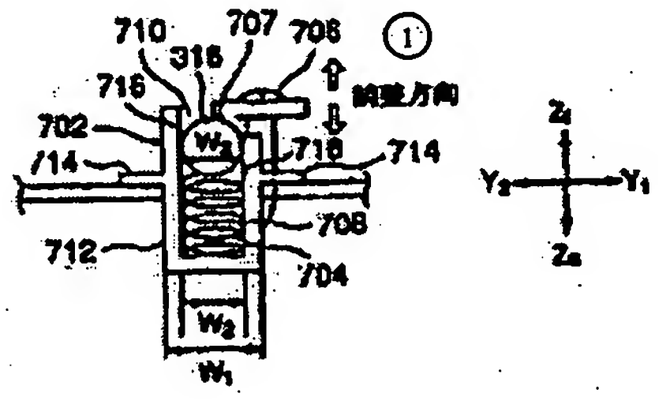

Key: 1 Adjustment direction

Claims

1. A type of adjustment mechanism for a disk device characterized by the following facts:

the adjustment mechanism is set on a base member that carries a guide rod for guiding movement of an optical pickup, and it is for adjustment of the parallelism of the optical pickup movement surface with respect to the disk surface;

in this adjustment mechanism, there are the following parts:

a holder that is installed on said base member and supports the end portion of said guide rod,

a coil spring that is accommodated in said holder and energizes said guide rod in the energizing direction nearly perpendicular to said optical pickup movement surface,

and a screw that is set on said base member, has a coupling portion for defining the displacement of said guide rod in said energizing direction, and can adjust the height in said energizing direction.

2. The adjustment mechanism for a disk device described in Claim 1 characterized by the fact that said holder has a holding portion, and by pressing said holding portion on said base member under the spring force of said coil spring in the direction opposite said energizing direction, said holder is kept in said base member.

3. The adjustment mechanism for a disk device described in Claim 1 or 2 characterized by the fact that said holder has a fitting portion fit in the mounting hole of said base member that defines the displacement of said holder in the direction nearly perpendicular to said energizing direction, and a wall portion that defines the displacement of said guide rod in the direction nearly perpendicular to said energizing direction.

4. A type of optical disk device characterized by the fact that it has the adjustment mechanism for a disk device described in any of Claims 1-3.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a type of disk device for performing recording/reproduction of a disk recording medium. More specifically, the present invention pertains to a type of base plate for a disk device that carries a guide rod for guiding the optical pickup.

[0002]

Prior art

A disk device is a device that performs the following operation: a laser beam is irradiated on a signal surface (recording surface) of a disk-like recording medium, such as a compact disk, CD-ROM, etc., and the information recorded by plural bits formed in a spiral shape on the signal surface is reproduced by variation in the light intensity of the reflected light of said laser beam. Examples of disk devices include CD players, CD-ROM drives, CD-R drives, DVD drives, etc.

[0003]

An optical pickup is carried on the disk device, and, when it detects the reflected light of the laser beam irradiated on the disk, it plays the important role of recording and/or reproducing

information on the disk. In the recording/reproduction operation, the disk is driven to rotate, and the optical pickup is driven to undergo reciprocal movement in the radial direction of the disk so as to trace a prescribed track. In this case, the optical pickup is driven to slide on a guide rod that extends in the radial direction of the disk. Consequently, from the viewpoint of prevention of error in recording/reproduction of the disk, the relationship between sliding of the optical pickup and rotation of the disk is very significant.

[0004]

However, in a practical manufacturing operation, errors in assembly of members and manufacturing errors for the members cannot be avoided. Consequently, when members are assembled, it is not an easy job to guarantee that the sliding surface of the optical pickup and the rotating surface of the disk will be parallel to each other. If this problem is not solved, errors in recording/reproduction of the disk take place. Consequently, an adjustment mechanism has been proposed that can guarantee parallelism between said surfaces in the disk device. In the prior art, the following constitution is adopted.

[0005]

As shown in Figure 5, in adjustment mechanism (600) of the prior art, when turntable (280) is carried on base plate (222), plural screws (606) having springs (604) are used to adjust the rotating surface of turntable (280) that defines the rotating surface (disk surface) of disk (100) and the surface of base plate (222) that carries guide rod (616). By means of this adjustment mechanism (600), after turntable (280) and guide rod (616) are carried on base plate (222), while plural screws (606) are individually driven to rotate, the inclination in the front/rear and left/right directions of turntable (280) with respect to base plate (222) is adjusted, so that parallelism between the disk surface and the optical pickup sliding surface can be realized.

[0006]

Problems to be solved by the invention

However, in the actual assembly operation of said adjustment mechanism (600) wherein turntable (280) is fixed on base plate (222) by means of screws (606) via springs (604), when turntable (280) is carried on base plate (222), springs (604) may be pulled out and fall, so that the operability is poor. This is undesirable. Also, because turntable (280) is prone to generation of vibration during rotation of the disk, a high spring pressure of springs (604) is needed. In this way, the assembly operability is poor, and, in the operation of adjustment of the parallelism between the disk surface and the optical pickup sliding surface, fine adjustment is difficult, and the operability is poor. This is undesirable.

[0007]

The objective of the present invention is to solve the aforementioned problems of the prior art by providing a type of adjustment mechanism that can easily adjust the parallelism between the disk surface and the optical pickup sliding surface, and a type of optical disk device having said adjustment mechanism.

[0008]

Means to solve the problems

In order to solve the aforementioned problems, Claim 1 of the present patent application provides a type of adjustment mechanism for a disk device characterized by the following facts: the adjustment mechanism is set on a base member that carries a guide rod for guiding movement of the optical pickup, and it is for adjustment of the parallelism of the optical pickup movement surface with respect to the disk surface; in this adjustment mechanism, there are the following parts: a holder that is installed on said base member and supports the end portion of said guide rod, a coil spring that is accommodated in said holder and energizes said guide rod in the energizing direction nearly perpendicular to said optical pickup movement surface, and a screw that is set on said base member, has a coupling portion for defining the displacement of said guide rod in said energizing direction, and can adjust the height in said energizing direction.

[0009]

According to the present invention with the aforementioned constitution, the coil spring is accommodated in a holder, so that when the holder is carried on the base member, there is little chance that the coil spring will fall off. As a result, the operability is improved. Also, since the holder for holding the guide rod is used as an adjustment mechanism, there is no increase in the number of parts. In addition, when the rotating surface of the turntable is adjusted to be parallel to the surface of the base member, by simply adjusting the guide rod parallel to the surface of the base member, it is possible to guarantee parallelism between the rotating surface of the turntable and the optical pickup sliding surface that defines the guide rod. Consequently, adjustment is easier. Also, when the guide rod has a constitution that extends in the front/rear direction of the base member for a relatively long distance, the parallelism with the base member can be judged easily and at a relatively high precision.

[0010]

According to Claim 2 of the present patent application, said holder has a holding portion, and, by pressing said holding portion on said base member under the spring force of said coil

spring in the direction opposite said energizing direction, said holder is kept in said base member.

[0011]

According to said feature of the present invention, the spring pressure of the coil spring can be used effectively, and there is no need to fasten the holder on the base member by means of screws, etc., so it is possible to reduce the number of parts.

[0012]

According to Claim 3 of the present patent application, said holder has a fitting portion fit in the mounting hole of said base member that defines displacement of said holder in a direction nearly perpendicular to said energizing direction, and a wall portion that defines the displacement of said guide rod in a direction nearly perpendicular to said energizing direction.

[0013]

According to the aforementioned feature of the present patent application, it is possible to completely position the holder on the base member, and at the same time, the guide rod can be positioned by the positioned holder. Consequently, the left/right positioning precision of the guide rod can be easily guaranteed. As a result, the control of the position of the guide rod is easier, and stability of the optical pickup sliding on it can be realized.

[0014]

According to Claim 4 of the present patent application, an optical disk device can make appropriate use of said adjustment mechanism of the present invention. Such an optical disk device can be manufactured easily, the recording/reproduction precision can be improved, and functions can be displayed with high stability.

[0015]

In the following, other objectives, constitutions and effects of the present invention will be explained with reference to embodiments presented below.

[0016]

Embodiment of the invention

In the following, the disk device and the optical pickup movement mechanism used in said disk device of the present invention will be explained in more detail with reference to application examples illustrated with annexed figures.

[0017]

Figure 1 is an exploded view of the disk device of the present invention. As shown in Figure 1, the disk device of the present invention has the following parts: loading chassis (120), disk tray (160) that has disk carrying part (162) that carries disk (100), and that moves front/rear with respect to loading chassis (120) between the loading/unloading position of the disk and the disk reproduction position, main circuit board (200) set in the lower rear portion of loading chassis (120), feed chassis (220) that has optical pickup (250) or the like for performing recording/reproduction of disk (100) set in it, rotating frame (340) for rotating feed chassis (220) between a raised position and lowered position, loading cam mechanism (460) for manipulating disk tray (160) and rotating frame (340) set in the loading chassis, and casing (360) having outer cover (362) and accommodating said parts.

[0018]

As shown in Figure 1, on the rear side of loading chassis (120), feed chassis (220) equipped with optical pickup (250) or the like for performing recording/reproduction of disk (100) is set.

[0019]

More specifically, as shown in Figure 2, feed chassis (220) has base plate (222) formed from a metal sheet, optical pickup (250), and optical pickup movement mechanism (274) as a slide feeding mechanism that moves optical pickup (250) in the radial direction of disk (100). In order to facilitate adjustment of the parallelism to be explained later, it is preferred that feed chassis (220) also contain spindle motor (240) for rotating the turntable, and turntable (280) fixed on rotating shaft (242) of said spindle motor (240). In this case, spindle motor (240) is carried on base plate (222) such that the surface of base plate (222) is parallel to the surface of turntable (280).

[0020]

For turntable (280), disk (100) is held by a disk clamp (not shown in the figure) set on outer cover (362), and it is driven to rotate together with the rotation of spindle motor (240). Due to said rotation, disk (100) is also rotated, and recording/reproduction of disk (100) is performed. Consequently, the disk rotating surface is defined by the rotating surface of turntable (280).

[0021]

As shown in Figures 2(B) and 3, optical pickup movement mechanism (274) is composed of the following parts: thread motor (302) made of a DC motor that can be rotated forward/backward and set on the inner surface of base plate (222), motor gear (304) fixed on rotating shaft (320) of thread motor (302) protruding perpendicular to the upper surface of base plate (222) (see Figures 2 and 3), gear A (306) engaged with said motor gear (304) (see Figure 3), gear B (308) with a smaller diameter than that of gear A (308) formed monolithically and coaxially on the lower surface of gear A (306), slider (310) having rack gear (312) engaged with said gear B (308) and first guide rod bearing portion (266) for first guide rod (314) , first guide rod (314) that supports said slider (310) in a sliding movable way and extends in the front/rear direction of base plate (222), and second guide rod (316) that supports second bearing portion (330) on the side opposite first guide rod (314) of slider (310) and extends in the front/rear direction of base plate (222). By setting optical pickup (250) on said slider (310), in company with the movement of slider (310), optical pickup (250) can move in the radial direction of disk (100). Also, slider (310) is supported in a sliding movable way on first guide rod (314) by means of first guide rod bearing portion (266).

[0022]

As shown in Figure 3, the combination of said motor gear (304), gear A (306), gear B (308) and rack gear (312) forms a speed reducing gear mechanism in optical pickup movement mechanism (sliding feeding mechanism) (274). It reduces the rotating speed of thread motor (302) and converts it to linear movement of optical pickup (250). As a result, by performing forward/backward rotation of thread motor (302), optical pickup (250) can be driven to move in the radial direction of disk (100) along first guide rod (314) and second guide rod (316).

[0023]

More specifically, when thread motor (302) and motor gear (304) rotate clockwise as viewed axially from the upper side, gear B (308) rotates counter-clockwise as viewed axially from the upper side, and it is fed to the side in front of slider (310) that is integrated with rack gear (312) (the direction of turntable (280)). As a result, optical pickup (250) moves from the outer peripheral side of disk (100) to the inner peripheral side. On the other hand, when thread motor (302) rotates in the reverse direction, optical pickup (250) is driven to move from the inner peripheral side of disk (100) to the outer peripheral side.

[0024]

Due to said optical pickup movement mechanism (274), optical pickup (250) is driven to move in the radial direction of the disk along first guide rod (314) and second guide rod (316). Consequently, the optical pickup sliding surface is defined by said first guide rod (314) and second guide rod (316).

[0025]

On base plate (222) of feed chassis (220), there is adjustment mechanism (700) for adjusting the parallelism between the disk rotating surface and the optical pickup sliding surface. As shown in Figure 4, this adjustment mechanism (700) is installed on base plate (222), and it is composed of holder (702) that supports the end portion of second guide rod (316), coil spring (704) accommodated in holder (702), and screw (706) for adjusting the height of second guide rod (316) supported on base plate (222).

[0026]

Said holder (702) is made of a resin or the like, and it has fitting portion (712). As shown in Figures 4A and 4B, holder (702) is installed when fitting portion (712) of holder (702) is fit in the attachment hole of base plate (222).

[0027]

The width of fitting portion (712) of holder (702) in the left/right direction (directions Y_1 and Y_2 indicated in Figures 4A and 4B) (indicated by W_1 in Figure 4B) is formed nearly identical to the width of the mounting hole of base plate (222) in the left/right direction. As a result, the left/right direction (directions Y_1, Y_2) of holder (702) with respect to base plate (222) is positioned.

[0028]

Similarly, in order to prevent shaking of holder (702) in the front/rear direction (directions X_1, X_2 in Figures 4A, 4B), the width of fitting portion (712) of holder (702) in the front/rear direction (not shown in the figure) is formed nearly identical to the width of the mounting hole of base plate (222) in the front/rear direction. Of course, the mounting hole of base plate (222) may also be formed in a nearly circular shape, and by forming the shape of fitting portion (712) corresponding to it, said objective also can be realized.

[0029]

As shown in Figure 4, holder (702) has accommodating portion (708) for accommodating coil spring (704). It is preferable that accommodating portion (708) be defined when said fitting portion (712) is formed in a hollow shape.

[0030]

Said holder (702) also has holding portion (714) that presses base plate (222), and rod supporting portion (710) for supporting second guide rod (316). Said holding portion (714) contains a surface nearly parallel to the surface of base plate (222). As to be explained later, holder (702) is held with high reliability when said parallel surface of holding portion (714) hits the surface of said base plate (222).

[0031]

For said rod supporting portion (710), in order to define the movement of second guide rod (316) in the cross-sectional direction nearly parallel to the optical pickup sliding surface almost perpendicular to second guide rod (316) and almost parallel to the optical pickup sliding surface (directions Y_1, Y_2 shown in Figures 4A and 4B), it has two wall portions (716), (718) that hold second guide rod (316), and, in order to define the movement of second guide rod (316) in the longitudinal direction (directions X_1, X_2 indicated in Figures 4A and 4B), it has one wall portion (720) that stops the end portion of second guide rod (316).

[0032]

The width in said lateral direction between said two wall portions (716), (718) of rod supporting portion (710) (indicated by W_2 shown in Figure 4B) is preferably formed nearly equal to the width of said second guide rod (316) in said lateral direction (indicated by W_3 in Figure 4B). As a result, positioning of second guide rod (316) with respect to holder (702) is realized in said lateral direction (directions Y_1, Y_2). As a result, as explained above, holder (702) is positioned on base plate (222), so that the position precision of second guide rod (316) in said lateral direction (directions Y_1, Y_2) can be guaranteed by positioning it with respect to holder (702).

[0033]

As shown in Figure 4B, coil spring (704) is accommodated such that one end portion of coil spring (704) is seated on the bottom of accommodating portion (708), and the other end portion of coil spring (704) forms the bottom of rod supporting portion (710) inside holder (702). Consequently, second guide rod (316) supported on holder (702) is energized upward and

perpendicular to said optical pickup sliding surface by means of coil spring (704) that forms rod supporting portion (710) (in direction Z_1 in Figure 4B).

[0034]

Said adjusting screw (706) is screwed near second guide rod (316) such that the lower surface of the flange portion as coupling portion (707) of adjusting screw (706) is coupled to the upper portion of second guide rod (316). By means of the lower surface of the flange portion of said adjusting screw (706), displacement of second guide rod (316) in the upward direction (direction Z_1) when energized upward (direction Z_1) by coil spring (704) is restricted. As a result, the position of second guide rod (316) in the vertical direction (directions Z_1, Z_2) can be adjusted by adjusting the height of coupling portion (707) of adjusting screw (706) (screwing degree of adjusting screw (706)).

[0035]

Also, due to the reactive force of coil spring (704), holding portion (714) is pressed downward (direction Z_2) on base plate (222). Consequently, no screws, etc., are required and holder (702) can be held with high reliability on base plate (222). In this way, the spring pressure of coil spring (704) not only energizes second guide rod (316) upward (in direction Z_1) to adjust the height, but also acts to fix holder (702) on base plate (222).

[0036]

As a preferable application example of the present invention, in order to facilitate inclination adjustment of second guide rod (316), holder (702) is set on both the front end and rear end of second guide rod (316). Corresponding to this, adjusting screws (706) are also set near holder (702). However, holder (702) may also be set at either the front end or rear end of second guide rod (316). In this case, one adjusting screw (706) is set near holder (702).

[0037]

The present invention is not limited to the aforementioned application example. For example, holder (702) and adjusting screw (706) may also be set near first guide rod (314). Also, spindle motor (240) where turntable (280) is fixed may be carried on a base member other than base plate (222) where the optical pickup is carried. With the adjustment mechanism of the present invention, it is possible to adjust the parallelism between the disk rotating surface and the optical pickup sliding surface. In addition, although the present invention has been explained above with reference to an optical disk device having disks set laterally, it may also be adopted appropriately for an optical disk device with disks set vertically. In this case, the directions

adopted in the present specification (left/right, front/rear, upper/lower, or longitudinal direction, etc.) should be changed correspondingly.

[0038]

Effect of the invention

As explained above, the present invention displays the following effects. The present invention provides a type of base plate for a disk device wherein the parallelism between the disk rotating surface and the optical pickup sliding surface can be adjusted easily, and at the same time, the operability also can be improved.

[0039]

Also, by holding the holder that forms the adjustment mechanism on the base plate by means of the spring pressure of a coil spring, there is no need to use a screw or other fastening fixture, and it is thus possible to reduce the number of parts.

[0040]

In addition, by positioning the holder, the guide rod can be positioned easily with respect to the base plate, and it is possible to improve the precision of the product.

Brief description of the figures

Figure 1 is an exploded view illustrating the overall constitution of the disk device.

Figure 2: Figures 2(A) and (B) are an upper view and right side view of the feed chassis.

Figure 3 is an enlarged bottom view illustrating the gear mechanism of the feed chassis shown in Figure 2.

Figure 4: Figure 4(A) is an upper view of the base plate for the disk device in a preferable application example of the present invention, and it illustrates enlarged the L portion shown in Figure 2. Figure 4(B) is a cross-sectional view taken across M-M in Figure 4(A).

Figure 5 is a schematic diagram illustrating the adjustment mechanism in an example of the prior art.

Explanation of the reference symbols

100 Disk

120 Loading chassis

160 Disk tray

162 Disk carrying part

200 Main circuit board

220 Feed chassis
222 Base plate
226 Right-side extending portion
240 Spindle motor
242 Rotating shaft
250 Optical pickup
266 First guide rod bearing portion
274 Optical pickup movement mechanism
280 Turntable
302 Thread motor
304 Motor gear
306 Gear A
308 Gear B
310 Slider
312 Rack gear
314 First guide rod
316 Second guide rod
320 Rotating shaft
330 Second bearing portion
340 Rotating frame
360 Casing
362 Outer cover
460 Loading cam mechanism
600 Adjustment mechanism
604 Coil spring
606 Adjusting screw
616 Guide rod
700 Adjustment mechanism
702 Holder
704 Coil spring
706 Adjusting screw
707 Coupling portion
708 Accommodating portion
710 Rod supporting portion
712 Fitting portion
714 Holding portion

716 Wall portion

718 Wall portion

720 Wall portion

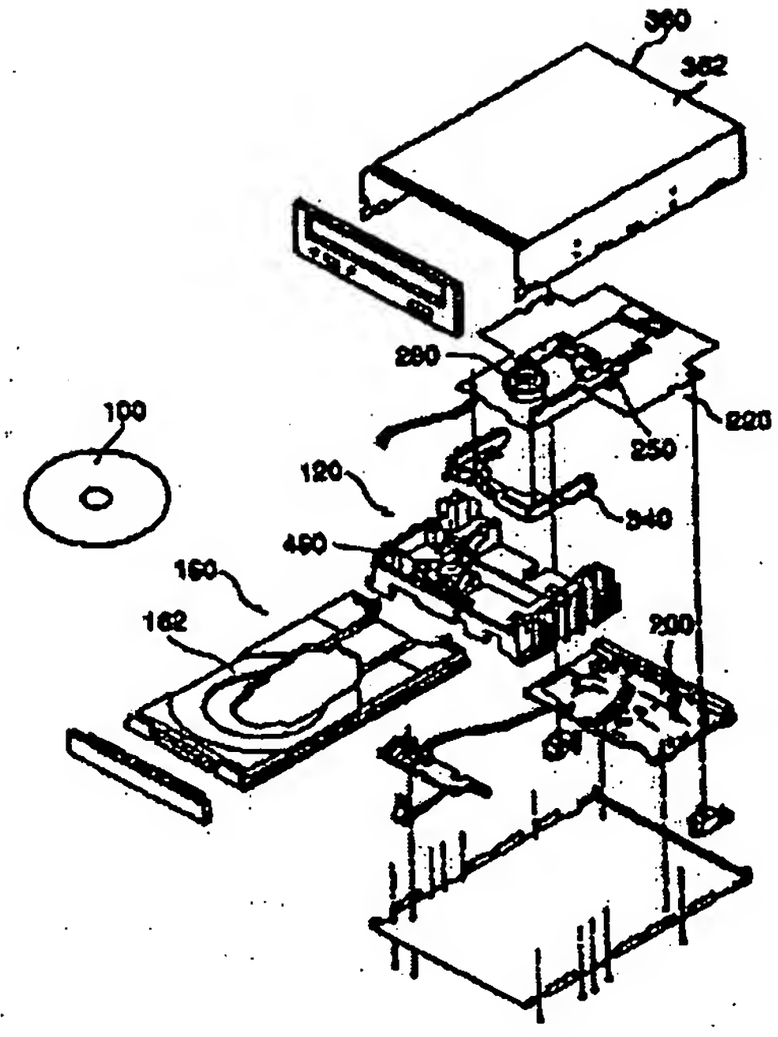

Figure 1

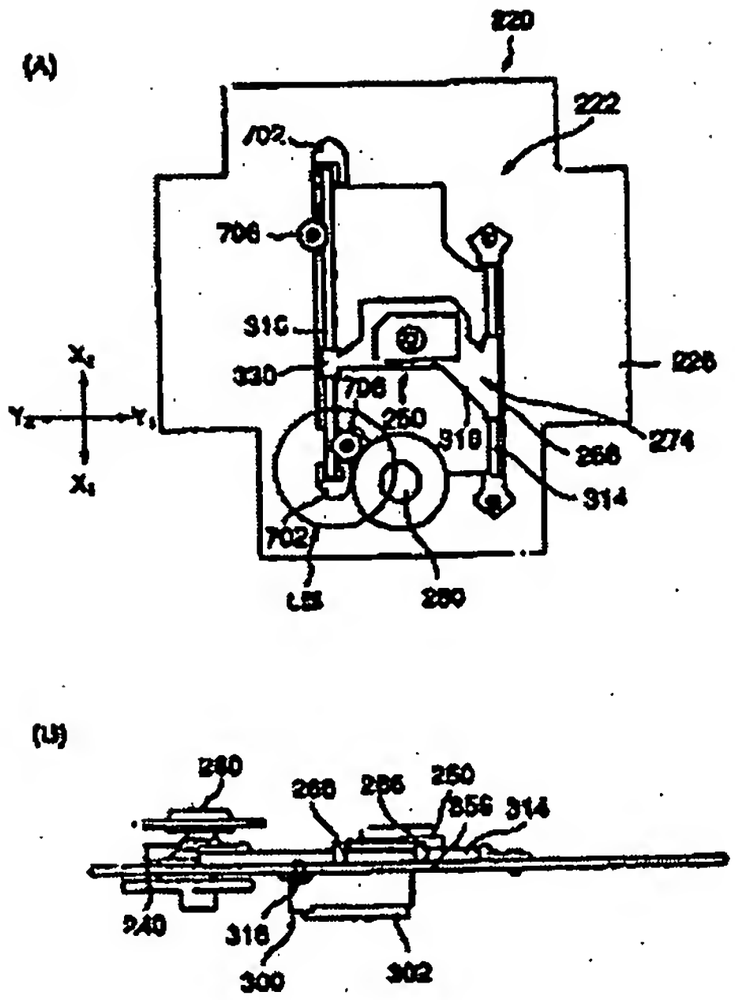

Figure 2

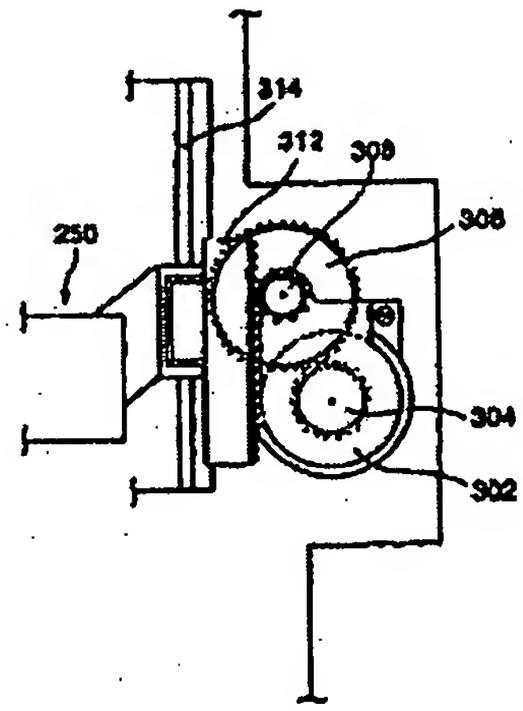

Figure 3

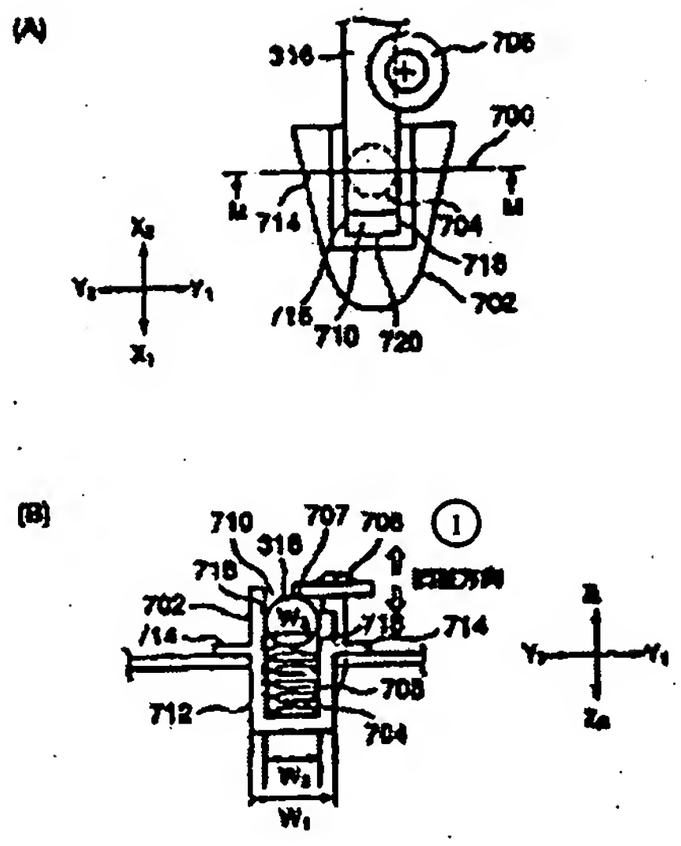

Figure 4

Key: 1 Adjustment direction

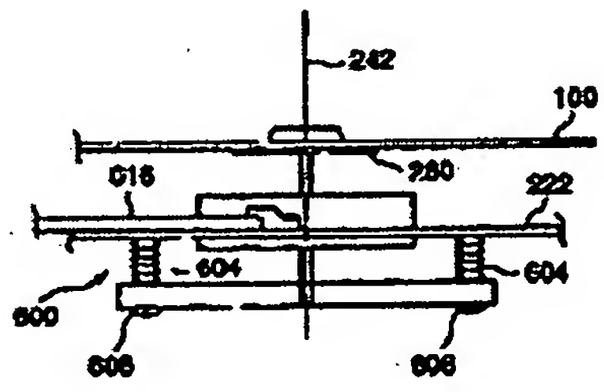

Figure 5

(19)日本国特許庁（ＪＰ）　(12)**公開特許公報**（A）　(11)特許出願公開番号
特開2003－91945
(P2003－91945A)
(43)公開日　平成15年３月28日(2003.3.28)

(51)Int.Cl.⁷	識別記号	FI	テーマコード（参考）
G11B 21/02	610	G11B 21/02	610D 5D068
7/08		7/08	A 5D117

審査請求　未請求　請求項の数４　ＯＬ　（全７頁）

(21)出願番号　特願2001－287215(P2001－287215)

(22)出願日　平成13年９月20日(2001.9.20)

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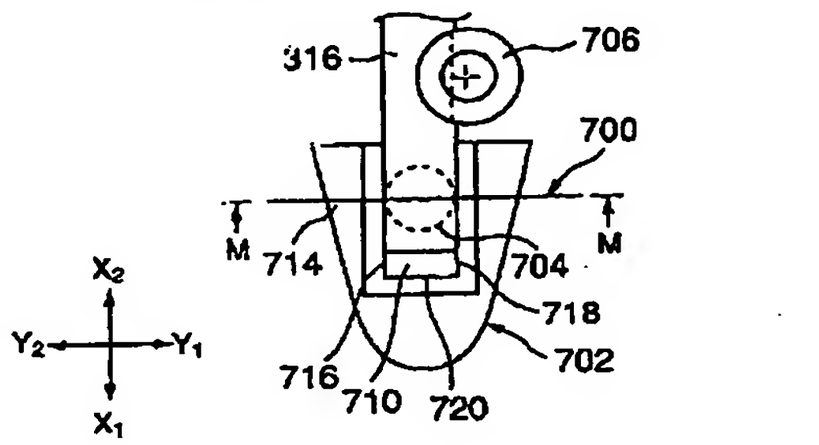
Ｆターム(参考)　5D068 AA02 BB01 CC02 EE05 GG06
5D117 AA02 CC07 JJ15 KK08 KK10
KK22

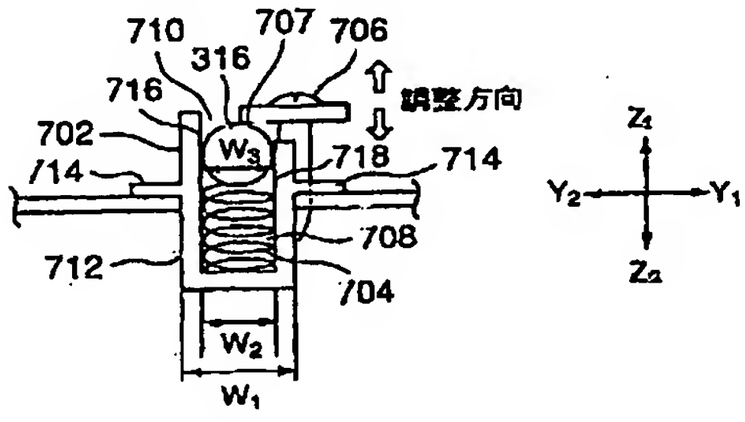
(54)【発明の名称】　ディスク装置用調整機構及びこれを使用する光ディスク装置

(57)【要約】
【課題】　本発明は、ディスク面の光ピックアップ摺動面との平行度の調整が容易である調整機構、及びこの調整機構を備えた光ディスク装置の提供を目的とする。
【解決手段】　本発明によると、光ピックアップ２５０の移動をガイドするガイドロッド３１６を搭載するベースプレート２２２では、ベースプレート２２２に搭載され、ガイドロッド３１６の端部を支持するホルダー７０２と、ホルダー７０２内に格納され、ガイドロッド３１６を上方向に付勢するコイルバネ７０４と、ベースプレート２２２に設けられ、ガイドロッド３１６の上方向の変位を規制するガイドロッド３１６との係合部７０７を有し、高さが調整可能である螺子７０６とを含み、ガイドロッド３１６の高さが、螺子７０６の高さを調整することによって、ベースプレート２２２の面に合わせて調整されたことを特徴とする。

(A)



(B)



【特許請求の範囲】
【請求項１】　光ピックアップの移動をガイドするガイドロッドを搭載するベース部材に設けられた、ディスク面に対する光ピックアップ移動面の平行度を調整するための調整機構であって、
上記ベース部材に装着され、上記ガイドロッドの端部を支持するホルダーと、
上記ホルダー内に格納され、上記ガイドロッドに対して上記光ピックアップ移動面に略垂直な付勢方向に付勢するコイルバネと、
上記ベース部材に設けられ、上記ガイドロッドの上記付勢方向の変位を規制する係合部を有し、上記付勢方向の高さが調整可能である螺子とを含む、ディスク装置用調整機構。
【請求項２】　上記ホルダーは保持部を有し、上記付勢方向と逆方向の上記コイルバネのバネ力により、上記保持部が上記ベース部材に押圧されることによって、上記ホルダーが、上記ベース部材に保持されていることを特徴とする、請求項１記載のディスク装置用調整機構。
【請求項３】　上記ホルダーは、上記付勢方向に対して略垂直な方向の上記ホルダーの変位を規制する上記ベース部材の取付穴に、嵌合される嵌合部と、上記付勢方向に対して略垂直な方向の上記ガイドロッドの変位を規制する壁部とを有することを特徴とする、請求項１若しくは２記載のディスク装置用調整機構。
【請求項４】　請求項１乃至３のいずれか１項に記載のディスク装置用調整機構を有した、光ディスク装置。
【発明の詳細な説明】
【０００１】
【発明の属する技術分野】本発明は、ディスク記録媒体の再生や記録を行うためのディスク装置に係り、より詳細には、光ピックアップをガイドするガイドロッドを搭載するディスク装置用ベースプレートに関する。
【０００２】
【従来の技術】ディスク装置は、例えばコンパクトディスクやＣＤ－ＲＯＭのようなディスク状の記録媒体の信号面（記録面）にレーザービームを照射し、信号面にスパイラル状に形成された多数のピットにより記録された情報を、レーザービームの反射光における光強度の変化を通じて再生する装置であり、例えばＣＤプレーヤやＣＤ－ＲＯＭドライブ、ＣＤ－Ｒドライブ、ＤＶＤドライブ等が含まれる。
【０００３】光ピックアップは、ディスク装置に搭載され、ディスクにレーザービームを照射し反射光の検出することによって、ディスクに情報を記録及び／又は再生するという重要な役割を果たす。記録及び／又は再生時、ディスクが回転し、光ピックアップは、ディスクの所定のトラックを追従するため、ディスクの半径方向に往復移動する。このとき、光ピックアップは、ディスクの半径方向に延在するガイドロッド上を摺動する。従って、ディスクの記録／再生のエラーを防止する観点から、光ピックアップの摺動とディスクの回転との関係は非常に重要な意義を有する。
【０００４】しかし、実際の製造においては、部品の組み付け誤差や部品自体の製造交差等が必然的に発生するので、部品組立時、光ピックアップの摺動する面と、ディスクの回転する面とを相互に平行に確保することは容易ではない。これを放置することはディスクの記録／再生のエラーを発生する原因となるので、ディスク装置にはこれらの面の平行を担保できるような調整機構が設けられており、従来の例として次のような構成が採用されていた。
【０００５】図５に示すように、従来の調整機構６００は、ターンテーブル２８０をベースプレート２２２に搭載する際に、バネ６０４を有する複数の螺子６０６を使用して、ディスク１００の回転面（ディスク面）を画成するターンテーブル２８０の回転面とガイドロッド６１６が搭載されるベースプレート２２２の面との調整を行うものであった。この調整機構６００によれば、ターンテーブル２８０及びガイドロッド６１６をベースプレート２２２に搭載した後、複数の螺子６０６を個別に回転させながら、ターンテーブル２８０のベースプレート２２２に対する前後左右方向の傾きを調整することによって、ディスク面と光ピックアップ摺動面との平行度が達成されていた。
【０００６】
【発明が解決しようとする課題】しかし、上記従来の調整機構６００の実際の組み付け作業においては、ターンテーブル２８０をベースプレート２２２にバネ６０４を通した螺子６０６によって固定するものであるため、ベースプレート２２２にターンテーブル２８０を搭載する際にバネ６０４が抜けて落下することもあり、作業性が悪いという問題点があった。また、ターンテーブル２８０は、ディスクを回転させた時に振動が発生し易いものであるため、バネ６０４のバネ圧を高くする必要があり、これによっても組み付け作業性が悪く、またディスク面と光ピックアップ摺動面との平行度の調整作業時においても微調整が難しくなり作業性が悪いという問題点があった。
【０００７】そこで、本発明は、組み付け時の作業性が良好であり、且つディスク面の光ピックアップ摺動面との平行度の調整が容易である調整機構、及びこの調整機構を備えた光ディスク装置の提供を目的とする。
【０００８】
【課題を解決するための手段】上記問題点を鑑み、請求項１記載のディスク装置用調整機構は、光ピックアップの移動をガイドするガイドロッドを搭載するベース部材に設けられた、ディスク面に対する光ピックアップ摺動面の平行度を調整するための調整機構であって、上記ベース部材に装着され、上記ガイドロッドの端部を支持す

るホルダーと、上記ホルダー内に格納され、上記ガイドロッドに対して上記光ピックアップ摺動面に略垂直な付勢方向に付勢するコイルバネと、上記ベース部材に設けられ、上記ガイドロッドの上記付勢方向の変位を規制する係合部を有し、上記付勢方向の高さが調整可能である螺子とを含む。

【０００９】上記発明によれば、コイルバネがホルダー内に格納されており、ホルダーをベース部材に搭載する組み付け時に、コイルバネが抜け落ちる可能性が低減され、作業性が向上される。また、ガイドロッドを保持するためのホルダーを調整機構として利用しているため、部品点数が増加することもない。更に、ターンテーブルの回転面がベース部材の面に平行に調整されている場合には、ガイドロッドをベース部材の面に対して平行に調整するだけで、ターンテーブルの回転面、即ちディスクの回転面とガイドロッドが画成する光ピックアップ摺動面との平行度が確保されるので、調整が容易である。また、ガイドロッドは、比較的長い距離にわたりベース部材の前後方向に延在する構成であるので、ベース部材との平行度を比較的に容易且つ精度良く判断することができる。

【００１０】また、請求項２記載のディスク装置用調整機構では、上記ホルダーは保持部を有し、上記付勢方向と逆方向の上記コイルバネのバネ力により、上記保持部が上記ベース部材に押圧されることによって、上記ホルダーが、上記ベース部材に保持されていることを特徴とする。

【００１１】上記発明によれば、コイルバネのバネ圧を有効に利用することができ、ホルダーをベース部材に螺子等によって締結させる必要がないので、部品点数を低減させることができる。

【００１２】また、請求項３記載のディスク装置用調整機構では、上記ホルダーは、上記付勢方向に対して略垂直な方向の上記ホルダーの変位を規制する上記ベース部材の取付穴に、嵌合される嵌合部と、上記付勢方向に対して略垂直な方向の上記ガイドロッドの変位を規制する壁部とを有することを特徴とする。

【００１３】上記発明によれば、ホルダーがベース部材に完全に位置決めされることができると同時に、位置決めされたホルダーによってガイドロッドが位置決めされるので、ガイドロッドの左右方向の位置精度を容易に確保することができる。この結果、ガイドロッドの位置管理が容易となり、その上を摺動する光ピックアップの動作の安定性を図ることができる。

【００１４】また、請求項４記載の光ディスク装置は、本発明のよる調整機構を適切に使用することができる。このような光ディスク装置は、製造が容易であり、記録／再生時の精度が向上され、安定した機能を発揮することができる。

【００１５】本発明の他の目的、構成及び効果は、図面を参照して行う以下の実施形態の説明から、より明らかになるだろう。

【００１６】

【発明の実施の形態】以下、本発明のディスク装置、及びこれに使用される光ピックアップ移動機構の好ましい実施形態について、添付図面に基づいて詳細に説明する。

【００１７】図１は、本発明に係るディスク装置の分解斜視図である。図１に示すように、本発明によるディスク装置は、ローディングシャーシ１２０と、ディスク１００を載置するディスク載置部１６２を有し、ローディングシャーシ１２０に対し、前後方向に移動し、ディスク着脱位置とディスク再生位置との間を移動するディスク搬送用のディスクトレイ１６０と、ローディングシャーシ１２０の後方下部に配列されたメイン回路基板２００と、ディスク１００の再生や記録を行うための光ピックアップ２５０等が設けられたフィードシャーシ２２０と、フィードシャーシ２２０を上昇位置と下降位置との間で回動させるための回動フレーム３４０と、ローディングシャーシに設けられたディスクトレイ１６０及び回動フレーム３４０を作動させるローディング カム機構４６０と、これらを収納しアウターカバー３６２を備えたケーシング３６０とを含む。

【００１８】ローディングシャーシ１２０の後方には、図１に示すように、ディスク１００の再生や記録を行うための光ピックアップ２５０等を備えたフィードシャーシ２２０が設けられている。

【００１９】より詳細に説明すると、フィードシャーシ２２０は、図２に示すように、金属板材によって形成されたベースプレート２２２と、光ピックアップ２５０と、光ピックアップ２５０をディスク１００の半径方向に移動させるスライド送り機構としての光ピックアップ移動機構２７４とを備えている。後述する平行度の調整の容易化のため、フィードシャーシ２２０は、好ましくは、ターンテーブル回転用のスピンドルモータ２４０と、スピンドルモータ２４０の回転軸２４２に固定されたターンテーブル２８０とを更に含む。かかる場合、スピンドルモータ２４０は、ベースプレート２２２の面とターンテーブル２８０の面とが平行になるように、ベースプレート２２２に搭載される。

【００２０】このターンテーブル２８０は、ディスク１００を、アウターカバー３６２に設けられたディスククランパ（図示せず）との間に挟持し、スピンドルモータ２４０の回転と共に回転される。その回転によって、ディスク１００も回転し、ディスク１００の再生／記録が行われる。従って、ディスク回転面は、ターンテーブル２８０の回転面によって定義される。

【００２１】また、この光ピックアップ移動機構２７４は、図２（Ｂ）及び図３に示されるように、ベースプレート２２２の裏側に設けられた正転／逆転可能なＤＣモ

ータからなるスレッドモータ３０２と、ベースプレート２２２の上面に垂直に突出したスレッドモータ３０２の回転軸３２０に固定されたモータギア３０４（図２及び図３参照）と、このモータギア３０４と噛合するギアＡ３０６（図３参照）と、このギアＡ３０６の下面に同軸上に一体に形成されたギアＡ３０６より小径のギアＢ３０８と、このギアＢ３０８と噛合するラックギア３１２及び第１のガイドロッド３１４に対する第１のガイドロッド軸受け部２６６を備えたスライダ３１０と、このスライダ３１０を摺動可能に支持しベースプレート２２２の前後方向に延在する第１のガイドロッド３１４と、スライダ３１０の第１のガイドロッド３１４とは反対側の第２の軸受け部３３０を摺動可能に支持するための、ベースプレート２２２の前後方向に延在する第２のガイドロッド３１６とで構成されている。そして、このスライダ３１０に、光ピックアップ２５０が設けられており、その結果光ピックアップ２５０はスライダ３１０の移動に伴ってディスク１００の半径方向に移動可能となっている。また、スライダ３１０は、第１のガイドロッド３１４に、第１のガイドロッド軸受け部２６６によって摺動可能に支持されている。

【００２２】図３に示すように、これらのモータギア３０４、ギアＡ３０６、ギアＢ３０８、ラックギア３１２の組合せにより、光ピックアップ移動機構（スライド送り機構）２７４における減速ギア機構を構成し、スレッドモータ３０２の回転を減速した上で光ピックアップ２５０の直線運動に変換している。それにより、光ピックアップ２５０は、スレッドモータ３０２を正逆いずれかに回転させることにより、第１のガイドロッド３１４及び第２のガイドロッド３１６に沿ってディスク１００の半径方向に移動可能に構成されている。

【００２３】より詳細に説明すると、スレッドモータ３０２及びモータギア３０４が軸方向上側から見て時計回りに回転すると、ギアＢ３０８が軸方向上側から見て反時計回りに回転し、ラックギア３１２と一体となったスライダ３１０の前方（ターンテーブル２８０の方向）に送られる。その結果、光ピックアップ２５０は、ディスク１００の外周側から内周側に向かって移動する。一方、スレッドモータ３０２が逆向きに回転すると、光ピックアップ２５０は、ディスク１００の内周側から外周側に向かって移動する。

【００２４】以上の光ピックアップ移動機構２７４により、第１のガイドロッド３１４及び第２のガイドロッド３１６に沿って光ピックアップ２５０がディスクの半径方向に移動する。従って、光ピックアップ摺動面は、これらのガイドロッド３１４，３１６によって定義される。

【００２５】フィードシャーシ２２０のベースプレート２２２には、ディスク回転面と光ピックアップ摺動面との平行度の調整をする調整機構７００が設けられている。この調整機構７００は、図４に示すように、ベースプレート２２２に装着され、第２のガイドロッド３１６の端部を支持するホルダー７０２と、ホルダー７０２に格納されたコイルバネ７０４と、ベースプレート２２２に支持された第２のガイドロッド３１６の高さを調整する調整螺子７０６とを含む。

【００２６】ホルダー７０２は、樹脂等によって形成され、嵌合部７１２を有する。ホルダー７０２は、図４Ａ及び図４Ｂに示すように、ベースプレート２２２の取付穴にホルダー７０２の嵌合部７１２を嵌合させることにより装着される。

【００２７】ホルダー７０２の嵌合部７１２の左右方向（図４Ａ及び図４Ｂにおいて指示するY_1，Y_2方向）の幅（図４Ｂにおいて、W_1により指示）は、ベースプレート２２２の取付穴の左右方向の幅と略同一になるように形成される。これによって、ホルダー７０２のベースプレート２２２に対する左右方向（Y_1，Y_2方向）の位置決めが達成される。

【００２８】同様に、ホルダー７０２の前後方向（図４Ａ及び図４Ｂにおいて指示するX_1，X_2方向）のガタツキを防止するため、ホルダー７０２の嵌合部７１２の前後方向の幅（図示せず）は、ベースプレート２２２の取付穴の前後方向の幅と略同一になるように形成される。但し、ベースプレート２２２の取付穴を略円形に形成し、これに対応した嵌合部７１２の形状を形成することによって、これらの目的を達成することも当然に可能である。

【００２９】図４に示すように、ホルダー７０２は、コイルバネ７０４を格納するための格納部７０８を備える。格納部７０８は、好ましくは、前記嵌合部７１２を中空に形成することにより画成される。

【００３０】ホルダー７０２は、ベースプレート２２２を押圧する保持部７１４と、第２のガイドロッド３１６を支持するためのロッド支持部７１０とを更に有する。保持部７１４は、ベースプレート２２２の面と略平行な面を含む。ホルダー７０２は、後述するように、保持部７１４の上記平行面をベースプレート２２２の面に当てることにより確実に保持される。

【００３１】前記ロッド支持部７１０は、第２のガイドロッド３１６に略垂直で且つ上で定義された光ピックアップ摺動面と略平行な横断方向（図４Ａ及び図４Ｂにおいて、Y_1，Y_2方向）における第２のガイドロッド３１６の動きを規制するため、第２のガイドロッド３１６を挟持する２つの壁部７１６，７１８を有し、第２のガイドロッド３１６の長手方向（図４Ａ及び図４Ｂにおいて指示するX_1，X_2方向）の動きを規制するため、第２のガイドロッド３１６の端部を止める１つの壁部７２０を有する。

【００３２】このロッド支持部７１０の前記２つの壁部７１６，７１８間の上記横断方向の幅（図４Ｂにおい

て、W_2により指示）は、好ましくは、第2のガイドロッド３１６の上記横断方向の幅（図４Ｂにおいて、W_3により指示）と略同一になるように形成される。これによって、第2のガイドロッド３１６のホルダー７０２に対する上記横断方向（Y_1，Y_2方向）の位置決めが達成される。この結果、ホルダー７０２が、上述したように、ベースプレート２２２に位置決めされているので、第2のガイドロッド３１６の上記横断方向（Y_1，Y_2方向）の位置精度は、ホルダー７０２との位置決めによって確保されることができる。

【００３３】図４Ｂに示すように、コイルバネ７０４は、ホルダー７０２の内部に、コイルバネ７０４の一の端部が、格納部７０８の底部に着座し、且つコイルバネ７０４の他の端部が、ロッド支持部７１０の底部を構成するように、格納される。従って、ホルダー７０２に支持された第2のガイドロッド３１６は、ロッド支持部７１０を構成するコイルバネ７０４によって、上記光ピックアップ摺動面に対して略垂直上向きの付勢方向（図４Ｂにおいて、Z_1方向）に付勢される。

【００３４】調整螺子７０６は、第2のガイドロッド３１６の近傍に、調整螺子７０６の係合部７０７であるフランジ部の下面が第2のガイドロッド３１６の上部と係合するように、螺着される。この調整螺子７０６のフランジ部の下面によって、コイルバネ７０４により上方向（Z_1方向）に付勢された第2のガイドロッド３１６の上方向（Z_1方向）の変位が拘束されることになる。これにより、第2のガイドロッド３１６の上下方向（Z_1，Z_2方向）の位置は、調整螺子７０６の係合部７０７の高さ（即ち、調整螺子７０６の螺進度）に従って調整されることができる。

【００３５】また、コイルバネ７０４の反作用力により、ベースプレート２２２に保持部７１４が下方向（Z_2方向）に押圧されるので、ホルダー７０２は、螺子等を用いることを要せず、ベースプレート２２２に確実に保持されることができる。このように、コイルバネ７０４によるバネ圧は、第2のガイドロッド３１６を上方向（Z_1方向）に付勢して高さを調整する役割だけでなく、ホルダー７０２をベースプレート２２２に固定する役割をも果たす。

【００３６】本発明の好ましい実施例においては、ホルダー７０２は、第2のガイドロッド３１６の傾斜調整の容易化のため、第2のガイドロッド３１６の前後端の双方に設けられる。これに対応して、調整螺子７０６も同様に、ホルダー７０２の近傍に配置される。但し、ホルダー７０２を、第2のガイドロッド３１６の前後端のいずれかの端部に設けることも可能である。この場合、1つの調整螺子７０６が、ホルダー７０２の近傍に配置される。

【００３７】本発明は、上述された実施例に限定されるものでないことを理解されるべきである。例えば、ホルダー７０２及び調整螺子７０６を、第1のガイドロッド３１４の近傍に配置することも当然に可能である。また、ターンテーブル２８０が固定されたスピンドルモータ２４０が、光ピックアップが搭載されたベースプレート２２２以外の他のベース部材に搭載されている場合であっても、本発明による調整機構によって、ディスク回転面と光ピックアップ摺動面との平行度の調整をすることができる。更に、本発明は、ディスク横置き型の光ディスク装置について言及してきたが、ディスク縦置き型の光ディスク装置についても適切に使用されることができる。この場合、本明細書において用いられた方向（左右、前後、上下、又は長手方向等）を表す表現が適宜変更されることになるだろう。

【００３８】

【発明の効果】本発明は、以上説明したようなものであるから、以下に記載されるような効果を奏する。本発明によるディスク装置用ベースプレートが提供されることによって、ディスク回転面と光ピックアップ摺動面との平行度を容易に調整することができると同時に、作業性をも向上することができる。

【００３９】また、調整機構を構成するホルダーをコイルバネのバネ圧を利用してベースプレートに保持することによって、螺子等の締結具が不要となり、部品点数を低減することができる。

【００４０】更に、ホルダーを位置決めすることによって、ベースプレートに対してガイドロッドを容易に位置決めすることができ、製品の精度を向上することができる。

【図面の簡単な説明】

【図１】ディスク装置の全体構成を示す分解斜視図である。

【図２】図２（Ａ）及び図２（Ｂ）は、フィードシャーシの上面図及び右側面図である。

【図３】図２のフィードシャーシのギア機構が拡大して示された底面図である。

【図４】図４（Ａ）は、図２のＬ部を拡大した本発明の好ましい実施例によるディスク装置用ベースプレートの上面図であり、図４（Ｂ）は、図４（Ａ）のラインＭ－Ｍにより切断された断面図である。

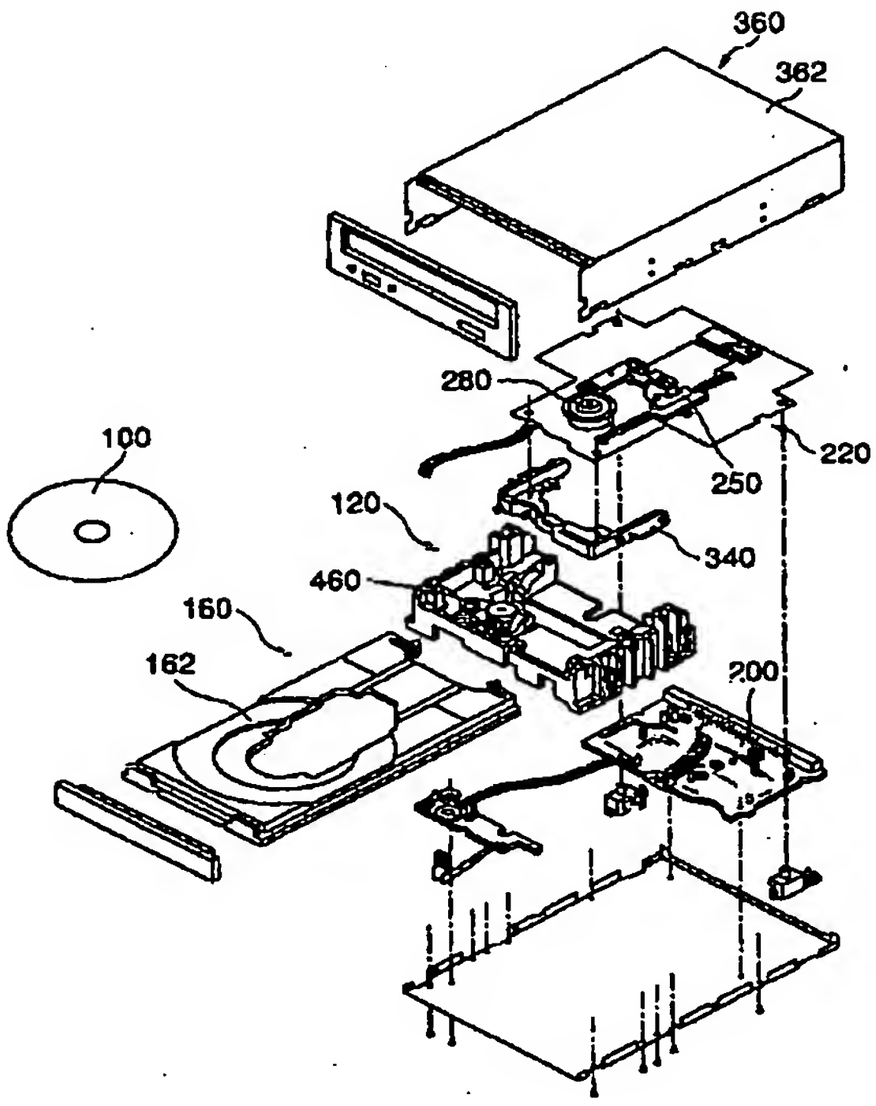
【図５】従来の実施例による調整機構を概略的に示す図である。

【符号の説明】

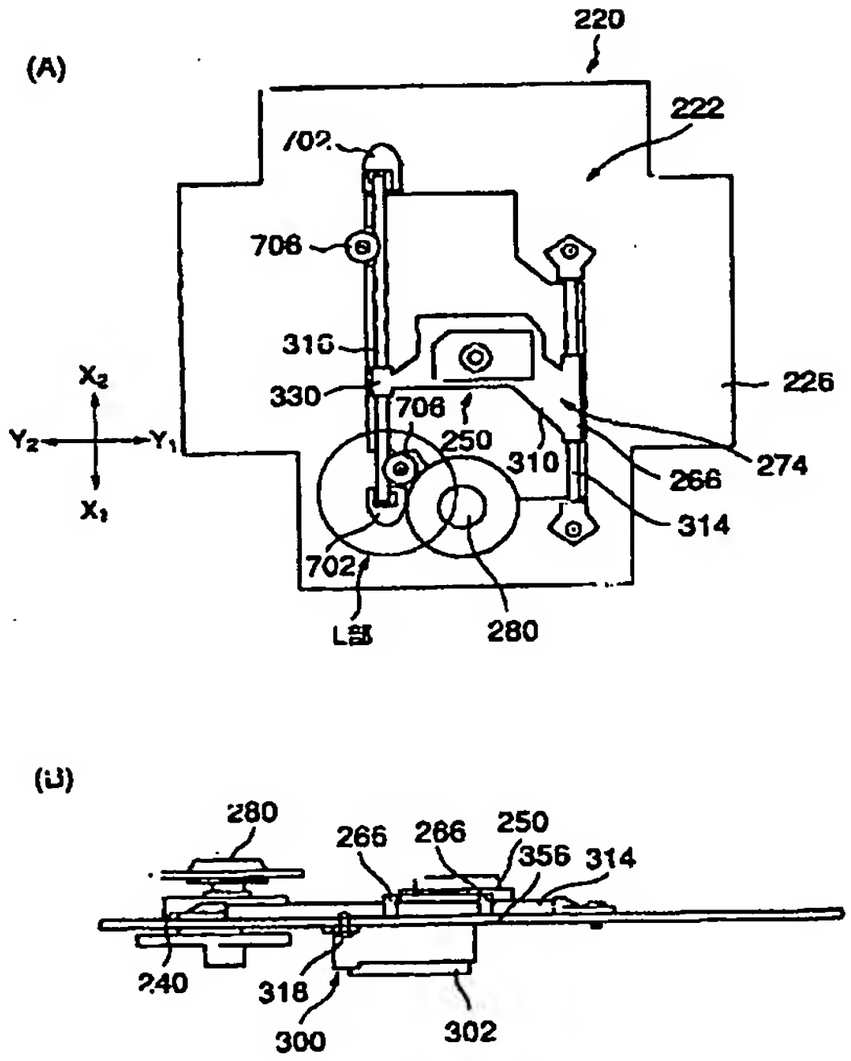
１００　ディスク
１２０　ローディングシャーシ
１６０　ディスクトレイ
１６２　ディスク載置部
２００　メイン回路基板
２２０　フィードシャーシ
２２２　ベースプレート
２２６　右側張り出し部

240 スピンドルモータ
242 回転軸
250 光ピックアップ
266 第1の軸受け部
274 光ピックアップ移動機構
280 ターンテーブル
302 スレッドモータ
304 モータギア
306 ギアA
308 ギアB
310 スライダ
312 ラックギア
314 第1のガイドロッド
316 第2のガイドロッド
320 回転軸
330 第2の軸受け部
340 回動フレーム
360 ケーシング
362 アウターカバー
460 ローディング カム機構
600 調整機構
604 コイルバネ
606 調整螺子
616 ガイドロッド
700 調整機構
702 ホルダー
704 コイルバネ
706 調整螺子
707 係合部
708 格納部
710 ロッド支持部
712 嵌合部
714 保持部
716 壁部
718 壁部
720 壁部

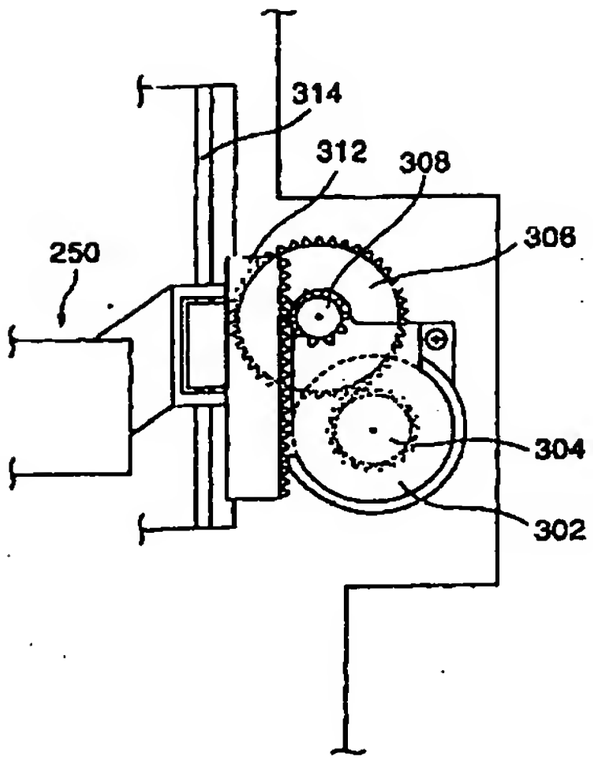
【図1】



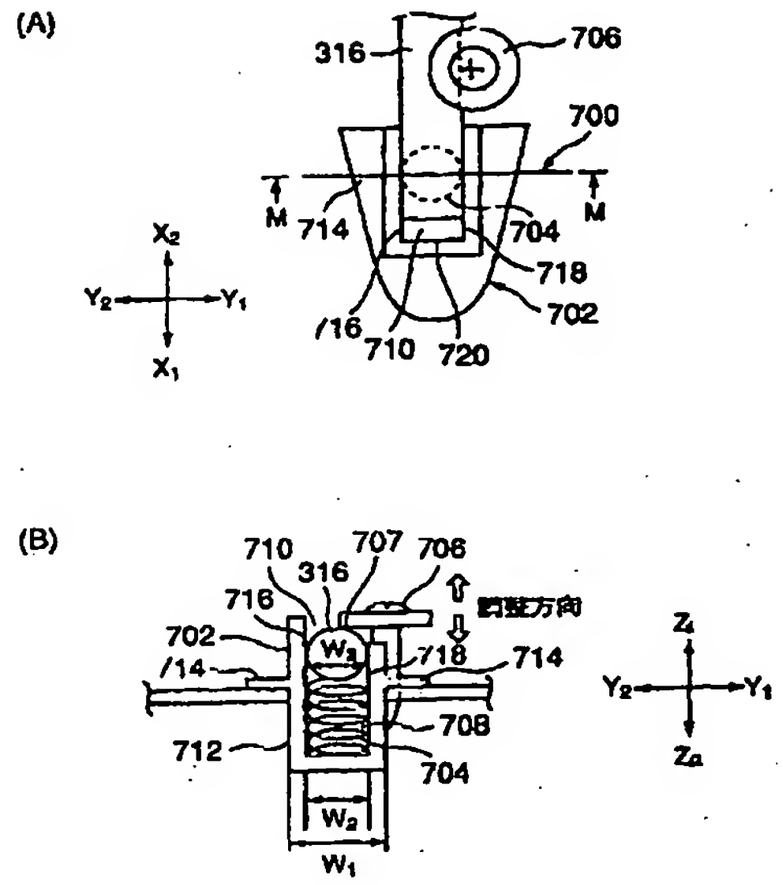
【図2】



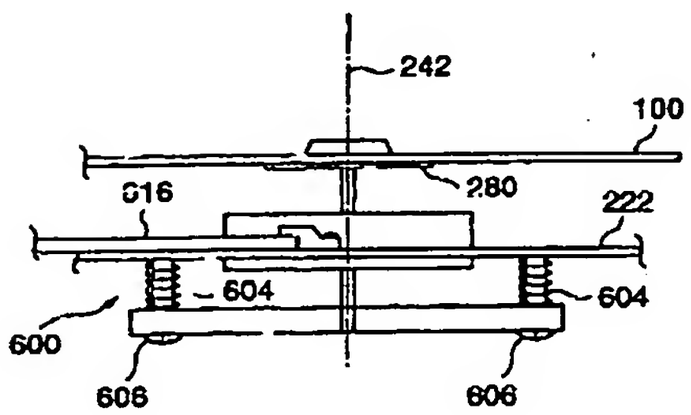
【図3】


314
312
308
306
250
304
302

【図4】


(A)
316
706
700
M
714
704
M
718
702
716
710
720
X2
Y2
Y1
X1
(B)
710
707
706
316
716
固定方向
702
W3
718
714
714
708
712
704
W2
W1
Z1
Y2
Y1
Z2

【図5】


242
100
280
216
222
604
604
600
606
606

Japanese Kokai Patent Application No. P2003-91945A

Job No.: 228-108702
Ref.: JP 2005-91945[D030125 US/PAV(DAVIDA)/#7049
Translated from Japanese by the McElroy Translation Company
800-531-9977 customerservice@mcelroytranslation.com

JAPANESE PATENT OFFICE
PATENT JOURNAL
KOKAI PATENT APPLICATION NO. P2003-91945A

Int. Cl.[7]: G 11 B 21/02
7/08

Filing No.: P2001-287215

Filing Date: September 20, 2001

Publication Date: March 28, 2003

No. of Claims: 4 (Total of 7 pages; OL)

Examination Request: Not filed

ADJUSTMENT MECHANISM FOR DISK DEVICE AND OPTICAL DISK DEVICE USING SAME

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[There are no amendments to this patent.]

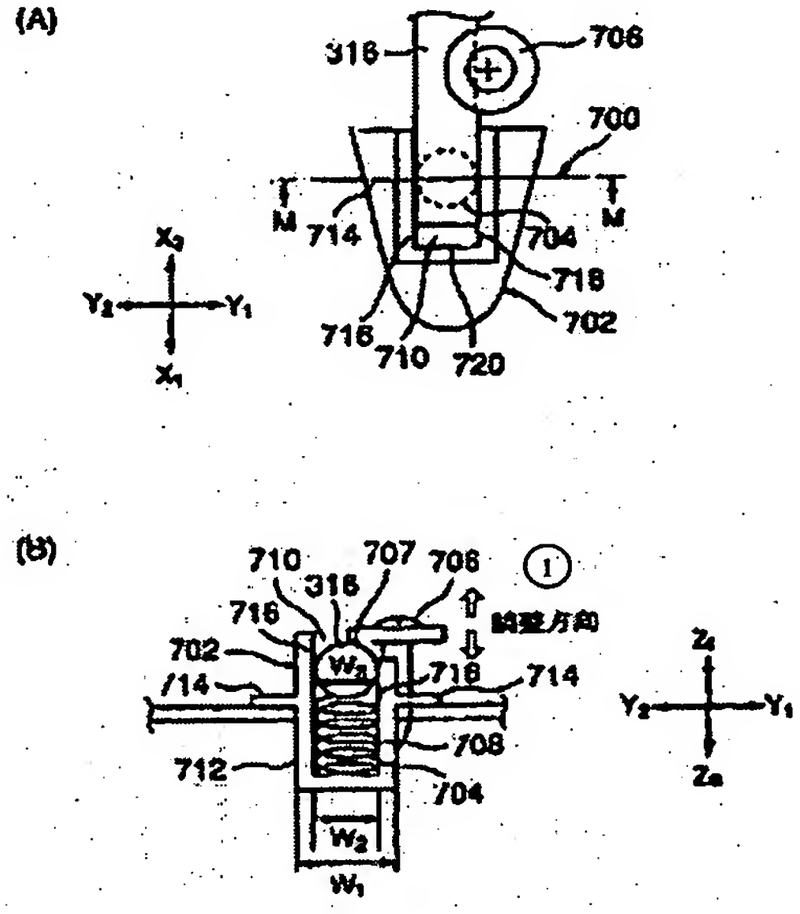
Abstract

Problem

The problem of the present invention is to provide a type of adjustment mechanism that can easily adjust the parallelism between a disk surface and an optical pickup sliding surface, and a type of optical disk device using said adjustment mechanism.

Constitution

The present invention is characterized by the following facts: on base plate (222) that carries guide rod (316) guiding movement of optical pickup (250), the following parts are set: holder (702) carried on base plate (222) and supporting the end portion of guide rod (316), coil spring (704) accommodated in holder (702) and energizing guide rod (316) upward, and height adjustable screw (706) set on base plate (222) and having coupling portion (707) with guide rod (316) and defining the upward displacement of guide rod (316). By adjusting the height of screw (706), the height of guide rod (316) can be adjusted flush with the surface of base plate (222).



Key: 1 Adjustment direction

Claims

1. A type of adjustment mechanism for a disk device characterized by the following facts:

the adjustment mechanism is set on a base member that carries a guide rod for guiding movement of an optical pickup, and it is for adjustment of the parallelism of the optical pickup movement surface with respect to the disk surface;

in this adjustment mechanism, there are the following parts:

a holder that is installed on said base member and supports the end portion of said guide rod,

a coil spring that is accommodated in said holder and energizes said guide rod in the energizing direction nearly perpendicular to said optical pickup movement surface,

and a screw that is set on said base member, has a coupling portion for defining the displacement of said guide rod in said energizing direction, and can adjust the height in said energizing direction.

2. The adjustment mechanism for a disk device described in Claim 1 characterized by the fact that said holder has a holding portion, and by pressing said holding portion on said base member under the spring force of said coil spring in the direction opposite said energizing direction, said holder is kept in said base member.

3. The adjustment mechanism for a disk device described in Claim 1 or 2 characterized by the fact that said holder has a fitting portion fit in the mounting hole of said base member that defines the displacement of said holder in the direction nearly perpendicular to said energizing direction, and a wall portion that defines the displacement of said guide rod in the direction nearly perpendicular to said energizing direction.

4. A type of optical disk device characterized by the fact that it has the adjustment mechanism for a disk device described in any of Claims 1-3.

Detailed explanation of the invention

[0001]

Technical field of the invention

The present invention pertains to a type of disk device for performing recording/reproduction of a disk recording medium. More specifically, the present invention pertains to a type of base plate for a disk device that carries a guide rod for guiding the optical pickup.

[0002]

Prior art

A disk device is a device that performs the following operation: a laser beam is irradiated on a signal surface (recording surface) of a disk-like recording medium, such as a compact disk, CD-ROM, etc., and the information recorded by plural bits formed in a spiral shape on the signal surface is reproduced by variation in the light intensity of the reflected light of said laser beam. Examples of disk devices include CD players, CD-ROM drives, CD-R drives, DVD drives, etc.

[0003]

An optical pickup is carried on the disk device, and, when it detects the reflected light of the laser beam irradiated on the disk, it plays the important role of recording and/or reproducing

information on the disk. In the recording/reproduction operation, the disk is driven to rotate, and the optical pickup is driven to undergo reciprocal movement in the radial direction of the disk so as to trace a prescribed track. In this case, the optical pickup is driven to slide on a guide rod that extends in the radial direction of the disk. Consequently, from the viewpoint of prevention of error in recording/reproduction of the disk, the relationship between sliding of the optical pickup and rotation of the disk is very significant.

[0004]

However, in a practical manufacturing operation, errors in assembly of members and manufacturing errors for the members cannot be avoided. Consequently, when members are assembled, it is not an easy job to guarantee that the sliding surface of the optical pickup and the rotating surface of the disk will be parallel to each other. If this problem is not solved, errors in recording/reproduction of the disk take place. Consequently, an adjustment mechanism has been proposed that can guarantee parallelism between said surfaces in the disk device. In the prior art, the following constitution is adopted.

[0005]

As shown in Figure 5, in adjustment mechanism (600) of the prior art, when turntable (280) is carried on base plate (222), plural screws (606) having springs (604) are used to adjust the rotating surface of turntable (280) that defines the rotating surface (disk surface) of disk (100) and the surface of base plate (222) that carries guide rod (616). By means of this adjustment mechanism (600), after turntable (280) and guide rod (616) are carried on base plate (222), while plural screws (606) are individually driven to rotate, the inclination in the front/rear and left/right directions of turntable (280) with respect to base plate (222) is adjusted, so that parallelism between the disk surface and the optical pickup sliding surface can be realized.

[0006]

Problems to be solved by the invention

However, in the actual assembly operation of said adjustment mechanism (600) wherein turntable (280) is fixed on base plate (222) by means of screws (606) via springs (604), when turntable (280) is carried on base plate (222), springs (604) may be pulled out and fall, so that the operability is poor. This is undesirable. Also, because turntable (280) is prone to generation of vibration during rotation of the disk, a high spring pressure of springs (604) is needed. In this way, the assembly operability is poor, and, in the operation of adjustment of the parallelism between the disk surface and the optical pickup sliding surface, fine adjustment is difficult, and the operability is poor. This is undesirable.

[0007]

The objective of the present invention is to solve the aforementioned problems of the prior art by providing a type of adjustment mechanism that can easily adjust the parallelism between the disk surface and the optical pickup sliding surface, and a type of optical disk device having said adjustment mechanism.

[0008]

Means to solve the problems

In order to solve the aforementioned problems, Claim 1 of the present patent application provides a type of adjustment mechanism for a disk device characterized by the following facts: the adjustment mechanism is set on a base member that carries a guide rod for guiding movement of the optical pickup, and it is for adjustment of the parallelism of the optical pickup movement surface with respect to the disk surface; in this adjustment mechanism, there are the following parts: a holder that is installed on said base member and supports the end portion of said guide rod, a coil spring that is accommodated in said holder and energizes said guide rod in the energizing direction nearly perpendicular to said optical pickup movement surface, and a screw that is set on said base member, has a coupling portion for defining the displacement of said guide rod in said energizing direction, and can adjust the height in said energizing direction.

[0009]

According to the present invention with the aforementioned constitution, the coil spring is accommodated in a holder, so that when the holder is carried on the base member, there is little chance that the coil spring will fall off. As a result, the operability is improved. Also, since the holder for holding the guide rod is used as an adjustment mechanism, there is no increase in the number of parts. In addition, when the rotating surface of the turntable is adjusted to be parallel to the surface of the base member, by simply adjusting the guide rod parallel to the surface of the base member, it is possible to guarantee parallelism between the rotating surface of the turntable and the optical pickup sliding surface that defines the guide rod. Consequently, adjustment is easier. Also, when the guide rod has a constitution that extends in the front/rear direction of the base member for a relatively long distance, the parallelism with the base member can be judged easily and at a relatively high precision.

[0010]

According to Claim 2 of the present patent application, said holder has a holding portion, and, by pressing said holding portion on said base member under the spring force of said coil

spring in the direction opposite said energizing direction, said holder is kept in said base member.

[0011]

According to said feature of the present invention, the spring pressure of the coil spring can be used effectively, and there is no need to fasten the holder on the base member by means of screws, etc., so it is possible to reduce the number of parts.

[0012]

According to Claim 3 of the present patent application, said holder has a fitting portion fit in the mounting hole of said base member that defines displacement of said holder in a direction nearly perpendicular to said energizing direction, and a wall portion that defines the displacement of said guide rod in a direction nearly perpendicular to said energizing direction.

[0013]

According to the aforementioned feature of the present patent application, it is possible to completely position the holder on the base member, and at the same time, the guide rod can be positioned by the positioned holder. Consequently, the left/right positioning precision of the guide rod can be easily guaranteed. As a result, the control of the position of the guide rod is easier, and stability of the optical pickup sliding on it can be realized.

[0014]

According to Claim 4 of the present patent application, an optical disk device can make appropriate use of said adjustment mechanism of the present invention. Such an optical disk device can be manufactured easily, the recording/reproduction precision can be improved, and functions can be displayed with high stability.

[0015]

In the following, other objectives, constitutions and effects of the present invention will be explained with reference to embodiments presented below.

[0016]

Embodiment of the invention

In the following, the disk device and the optical pickup movement mechanism used in said disk device of the present invention will be explained in more detail with reference to application examples illustrated with annexed figures.

[0017]

Figure 1 is an exploded view of the disk device of the present invention. As shown in Figure 1, the disk device of the present invention has the following parts: loading chassis (120), disk tray (160) that has disk carrying part (162) that carries disk (100), and that moves front/rear with respect to loading chassis (120) between the loading/unloading position of the disk and the disk reproduction position, main circuit board (200) set in the lower rear portion of loading chassis (120), feed chassis (220) that has optical pickup (250) or the like for performing recording/reproduction of disk (100) set in it, rotating frame (340) for rotating feed chassis (220) between a raised position and lowered position, loading cam mechanism (460) for manipulating disk tray (160) and rotating frame (340) set in the loading chassis, and casing (360) having outer cover (362) and accommodating said parts.

[0018]

As shown in Figure 1, on the rear side of loading chassis (120), feed chassis (220) equipped with optical pickup (250) or the like for performing recording/reproduction of disk (100) is set.

[0019]

More specifically, as shown in Figure 2, feed chassis (220) has base plate (222) formed from a metal sheet, optical pickup (250), and optical pickup movement mechanism (274) as a slide feeding mechanism that moves optical pickup (250) in the radial direction of disk (100). In order to facilitate adjustment of the parallelism to be explained later, it is preferred that feed chassis (220) also contain spindle motor (240) for rotating the turntable, and turntable (280) fixed on rotating shaft (242) of said spindle motor (240). In this case, spindle motor (240) is carried on base plate (222) such that the surface of base plate (222) is parallel to the surface of turntable (280).

[0020]

For turntable (280), disk (100) is held by a disk clamp (not shown in the figure) set on outer cover (362), and it is driven to rotate together with the rotation of spindle motor (240). Due to said rotation, disk (100) is also rotated, and recording/reproduction of disk (100) is performed. Consequently, the disk rotating surface is defined by the rotating surface of turntable (280).

[0021]

As shown in Figures 2(B) and 3, optical pickup movement mechanism (274) is composed of the following parts: thread motor (302) made of a DC motor that can be rotated forward/backward and set on the inner surface of base plate (222), motor gear (304) fixed on rotating shaft (320) of thread motor (302) protruding perpendicular to the upper surface of base plate (222) (see Figures 2 and 3), gear A (306) engaged with said motor gear (304) (see Figure 3), gear B (308) with a smaller diameter than that of gear A (308) formed monolithically and coaxially on the lower surface of gear A (306), slider (310) having rack gear (312) engaged with said gear B (308) and first guide rod bearing portion (266) for first guide rod (314) , first guide rod (314) that supports said slider (310) in a sliding movable way and extends in the front/rear direction of base plate (222), and second guide rod (316) that supports second bearing portion (330) on the side opposite first guide rod (314) of slider (310) and extends in the front/rear direction of base plate (222). By setting optical pickup (250) on said slider (310), in company with the movement of slider (310), optical pickup (250) can move in the radial direction of disk (100). Also, slider (310) is supported in a sliding movable way on first guide rod (314) by means of first guide rod bearing portion (266).

[0022]

As shown in Figure 3, the combination of said motor gear (304), gear A (306), gear B (308) and rack gear (312) forms a speed reducing gear mechanism in optical pickup movement mechanism (sliding feeding mechanism) (274). It reduces the rotating speed of thread motor (302) and converts it to linear movement of optical pickup (250). As a result, by performing forward/backward rotation of thread motor (302), optical pickup (250) can be driven to move in the radial direction of disk (100) along first guide rod (314) and second guide rod (316).

[0023]

More specifically, when thread motor (302) and motor gear (304) rotate clockwise as viewed axially from the upper side, gear B (308) rotates counter-clockwise as viewed axially from the upper side, and it is fed to the side in front of slider (310) that is integrated with rack gear (312) (the direction of turntable (280)). As a result, optical pickup (250) moves from the outer peripheral side of disk (100) to the inner peripheral side. On the other hand, when thread motor (302) rotates in the reverse direction, optical pickup (250) is driven to move from the inner peripheral side of disk (100) to the outer peripheral side.

[0024]

Due to said optical pickup movement mechanism (274), optical pickup (250) is driven to move in the radial direction of the disk along first guide rod (314) and second guide rod (316). Consequently, the optical pickup sliding surface is defined by said first guide rod (314) and second guide rod (316).

[0025]

On base plate (222) of feed chassis (220), there is adjustment mechanism (700) for adjusting the parallelism between the disk rotating surface and the optical pickup sliding surface. As shown in Figure 4, this adjustment mechanism (700) is installed on base plate (222), and it is composed of holder (702) that supports the end portion of second guide rod (316), coil spring (704) accommodated in holder (702), and screw (706) for adjusting the height of second guide rod (316) supported on base plate (222).

[0026]

Said holder (702) is made of a resin or the like, and it has fitting portion (712). As shown in Figures 4A and 4B, holder (702) is installed when fitting portion (712) of holder (702) is fit in the attachment hole of base plate (222).

[0027]

The width of fitting portion (712) of holder (702) in the left/right direction (directions Y_1 and Y_2 indicated in Figures 4A and 4B) (indicated by W_1 in Figure 4B) is formed nearly identical to the width of the mounting hole of base plate (222) in the left/right direction. As a result, the left/right direction (directions Y_1, Y_2) of holder (702) with respect to base plate (222) is positioned.

[0028]

Similarly, in order to prevent shaking of holder (702) in the front/rear direction (directions X_1, X_2 in Figures 4A, 4B), the width of fitting portion (712) of holder (702) in the front/rear direction (not shown in the figure) is formed nearly identical to the width of the mounting hole of base plate (222) in the front/rear direction. Of course, the mounting hole of base plate (222) may also be formed in a nearly circular shape, and by forming the shape of fitting portion (712) corresponding to it, said objective also can be realized.

[0029]

As shown in Figure 4, holder (702) has accommodating portion (708) for accommodating coil spring (704). It is preferable that accommodating portion (708) be defined when said fitting portion (712) is formed in a hollow shape.

[0030]

Said holder (702) also has holding portion (714) that presses base plate (222), and rod supporting portion (710) for supporting second guide rod (316). Said holding portion (714) contains a surface nearly parallel to the surface of base plate (222). As to be explained later, holder (702) is held with high reliability when said parallel surface of holding portion (714) hits the surface of said base plate (222).

[0031]

For said rod supporting portion (710), in order to define the movement of second guide rod (316) in the cross-sectional direction nearly parallel to the optical pickup sliding surface almost perpendicular to second guide rod (316) and almost parallel to the optical pickup sliding surface (directions Y_1, Y_2 shown in Figures 4A and 4B), it has two wall portions (716), (718) that hold second guide rod (316), and, in order to define the movement of second guide rod (316) in the longitudinal direction (directions X_1, X_2 indicated in Figures 4A and 4B), it has one wall portion (720) that stops the end portion of second guide rod (316).

[0032]

The width in said lateral direction between said two wall portions (716), (718) of rod supporting portion (710) (indicated by W_2 shown in Figure 4B) is preferably formed nearly equal to the width of said second guide rod (316) in said lateral direction (indicated by W_3 in Figure 4B). As a result, positioning of second guide rod (316) with respect to holder (702) is realized in said lateral direction (directions Y_1, Y_2). As a result, as explained above, holder (702) is positioned on base plate (222), so that the position precision of second guide rod (316) in said lateral direction (directions Y_1, Y_2) can be guaranteed by positioning it with respect to holder (702).

[0033]

As shown in Figure 4B, coil spring (704) is accommodated such that one end portion of coil spring (704) is seated on the bottom of accommodating portion (708), and the other end portion of coil spring (704) forms the bottom of rod supporting portion (710) inside holder (702). Consequently, second guide rod (316) supported on holder (702) is energized upward and

perpendicular to said optical pickup sliding surface by means of coil spring (704) that forms rod supporting portion (710) (in direction Z_1 in Figure 4B).

[0034]

Said adjusting screw (706) is screwed near second guide rod (316) such that the lower surface of the flange portion as coupling portion (707) of adjusting screw (706) is coupled to the upper portion of second guide rod (316). By means of the lower surface of the flange portion of said adjusting screw (706), displacement of second guide rod (316) in the upward direction (direction Z_1) when energized upward (direction Z_1) by coil spring (704) is restricted. As a result, the position of second guide rod (316) in the vertical direction (directions Z_1, Z_2) can be adjusted by adjusting the height of coupling portion (707) of adjusting screw (706) (screwing degree of adjusting screw (706)).

[0035]

Also, due to the reactive force of coil spring (704), holding portion (714) is pressed downward (direction Z_2) on base plate (222). Consequently, no screws, etc., are required and holder (702) can be held with high reliability on base plate (222). In this way, the spring pressure of coil spring (704) not only energizes second guide rod (316) upward (in direction Z_1) to adjust the height, but also acts to fix holder (702) on base plate (222).

[0036]

As a preferable application example of the present invention, in order to facilitate inclination adjustment of second guide rod (316), holder (702) is set on both the front end and rear end of second guide rod (316). Corresponding to this, adjusting screws (706) are also set near holder (702). However, holder (702) may also be set at either the front end or rear end of second guide rod (316). In this case, one adjusting screw (706) is set near holder (702).

[0037]

The present invention is not limited to the aforementioned application example. For example, holder (702) and adjusting screw (706) may also be set near first guide rod (314). Also, spindle motor (240) where turntable (280) is fixed may be carried on a base member other than base plate (222) where the optical pickup is carried. With the adjustment mechanism of the present invention, it is possible to adjust the parallelism between the disk rotating surface and the optical pickup sliding surface. In addition, although the present invention has been explained above with reference to an optical disk device having disks set laterally, it may also be adopted appropriately for an optical disk device with disks set vertically. In this case, the directions

adopted in the present specification (left/right, front/rear, upper/lower, or longitudinal direction, etc.) should be changed correspondingly.

[0038]

Effect of the invention

As explained above, the present invention displays the following effects. The present invention provides a type of base plate for a disk device wherein the parallelism between the disk rotating surface and the optical pickup sliding surface can be adjusted easily, and at the same time, the operability also can be improved.

[0039]

Also, by holding the holder that forms the adjustment mechanism on the base plate by means of the spring pressure of a coil spring, there is no need to use a screw or other fastening fixture, and it is thus possible to reduce the number of parts.

[0040]

In addition, by positioning the holder, the guide rod can be positioned easily with respect to the base plate, and it is possible to improve the precision of the product.

Brief description of the figures

Figure 1 is an exploded view illustrating the overall constitution of the disk device.

Figure 2: Figures 2(A) and (B) are an upper view and right side view of the feed chassis.

Figure 3 is an enlarged bottom view illustrating the gear mechanism of the feed chassis shown in Figure 2.

Figure 4: Figure 4(A) is an upper view of the base plate for the disk device in a preferable application example of the present invention, and it illustrates enlarged the L portion shown in Figure 2. Figure 4(B) is a cross-sectional view taken across M-M in Figure 4(A).

Figure 5 is a schematic diagram illustrating the adjustment mechanism in an example of the prior art.

Explanation of the reference symbols

100	Disk
120	Loading chassis
160	Disk tray
162	Disk carrying part
200	Main circuit board

220 Feed chassis
222 Base plate
226 Right-side extending portion
240 Spindle motor
242 Rotating shaft
250 Optical pickup
266 First guide rod bearing portion
274 Optical pickup movement mechanism
280 Turntable
302 Thread motor
304 Motor gear
306 Gear A
308 Gear B
310 Slider
312 Rack gear
314 First guide rod
316 Second guide rod
320 Rotating shaft
330 Second bearing portion
340 Rotating frame
360 Casing
362 Outer cover
460 Loading cam mechanism
600 Adjustment mechanism
604 Coil spring
606 Adjusting screw
616 Guide rod
700 Adjustment mechanism
702 Holder
704 Coil spring
706 Adjusting screw
707 Coupling portion
708 Accommodating portion
710 Rod supporting portion
712 Fitting portion
714 Holding portion

716 Wall portion
718 Wall portion
720 Wall portion

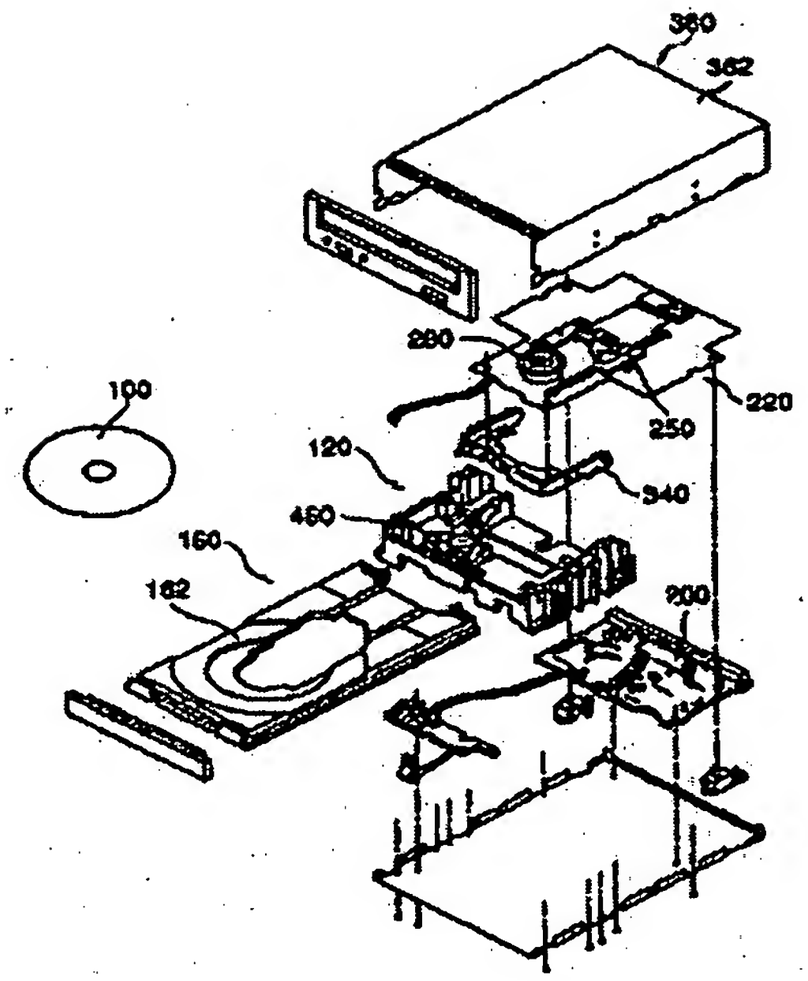


Figure 1

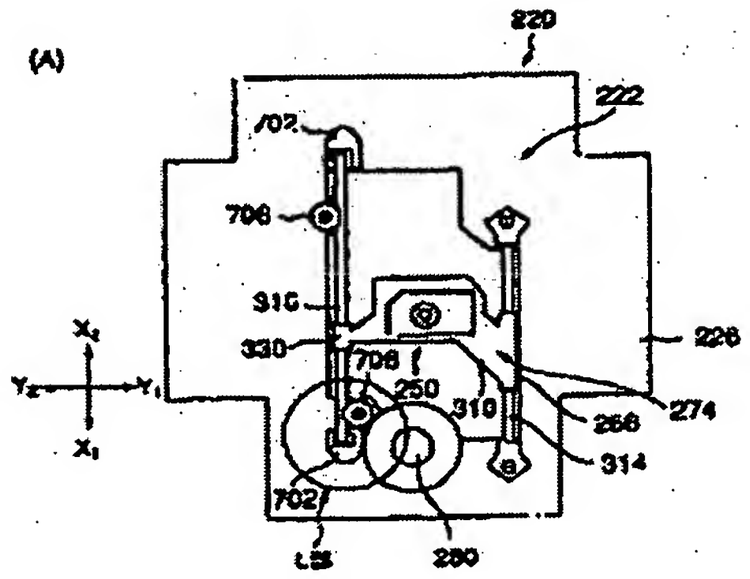


Figure 2

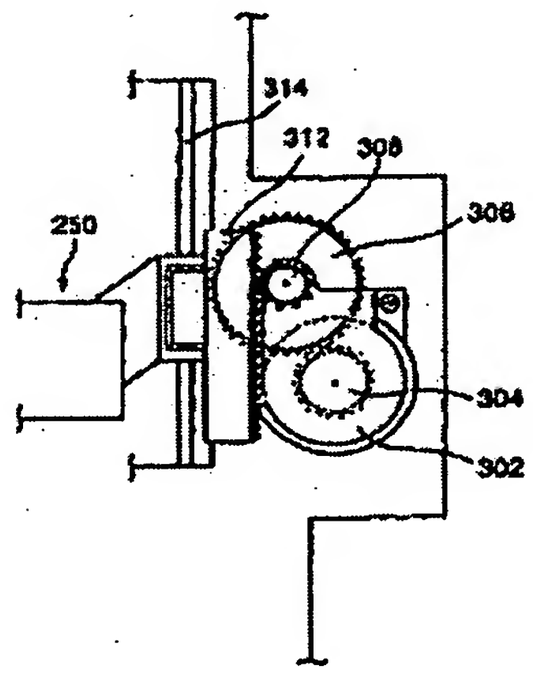


Figure 3

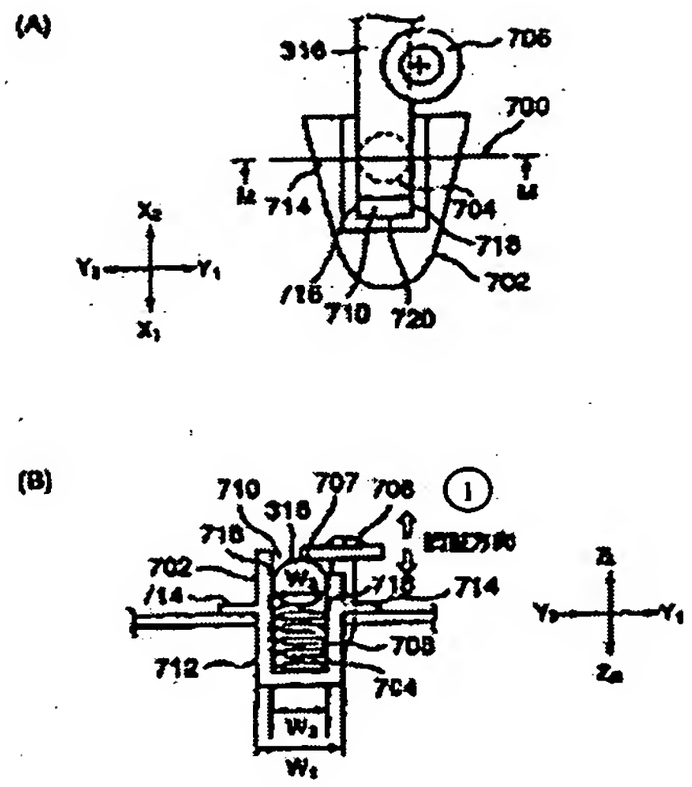


Figure 4

Key: 1 Adjustment direction

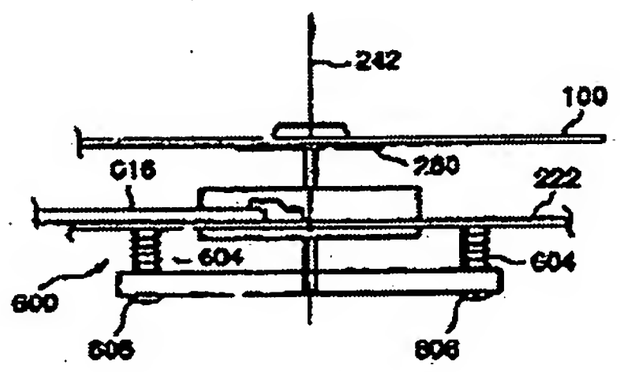


Figure 5